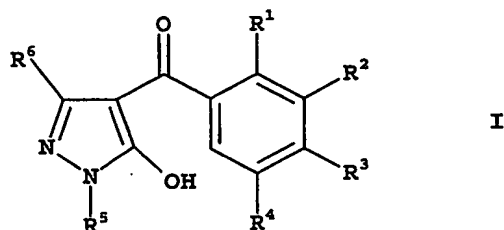


We claim:

1. A synergistic herbicidal mixture comprising

5 A) at least one 3-heterocyclyl-substituted benzoyl derivative of the formula I



10 in which the variables have the following meanings:

R^1 , R^3 are halogen, C_1 - C_6 -alkyl, C_1 - C_6 -haloalkyl, C_1 - C_6 -alkoxy, C_1 - C_6 -haloalkoxy, C_1 - C_6 -alkylthio, C_1 - C_6 -alkylsulfinyl or C_1 - C_6 -alkylsulfonyl;

15 R^2 is a heterocyclic radical selected from the group: isoxazol-3-yl, isoxazol-4-yl, isoxazol-5-yl, 4,5-dihydroisoxazol-3-yl, 4,5-dihydroisoxazol-4-yl and 4,5-dihydroisoxazol-5-yl, it being possible for
20 the six radicals mentioned to be unsubstituted or mono- or polysubstituted by halogen, C_1 - C_4 -alkyl, C_1 - C_4 -alkoxy, C_1 - C_4 -haloalkyl, C_1 - C_4 -haloalkoxy or C_1 - C_4 -alkylthio;

25 R^4 is hydrogen, halogen or C_1 - C_6 -alkyl;

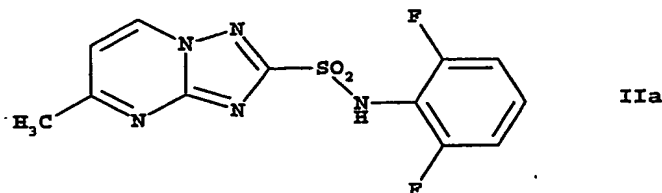
R^5 is C_1 - C_6 -alkyl;

R^6 is hydrogen or C_1 - C_6 -alkyl;

30 or one of its environmentally compatible salts;

and

B) at least the compound of formula IIa

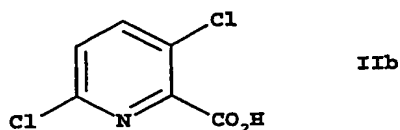


5 or one of its environmentally compatible salts;

or

the compound of formula IIb

10



or one of its environmentally compatible salts;

15 and, if desired,

C) at least one herbicidal compound from the group of the
acetyl-CoA carboxylase inhibitors (ACC), acetolactate
synthase inhibitors (ALS), amides, auxin herbicides,
20 auxin transport inhibitors, carotenoid biosynthesis in-
hibitors, enolpyruvylshikimate 3-phosphate synthase in-
hibitors (EPSPS), glutamine synthetase inhibitors,
lipid biosynthesis inhibitors, mitosis inhibitors, pro-
toporphyrinogen IX oxidase inhibitors, photosynthesis
25 inhibitors, synergists, growth substances, cell wall
biosynthesis inhibitors and a variety of other herbi-
cides;

in a synergistically effective amount.

30

2. A synergistic herbicidal mixture as claimed in claims 1, comprising, as component A), a 3-heterocyclyl-substituted benzoyl derivative of the formula I, where R⁴ is hydrogen.
- 5 3. A synergistic herbicidal mixture as claimed in any of claims 1 to 2, comprising, as component A), a 3-heterocyclyl-substituted benzoyl derivative of the formula I, where
- 10 R¹ is halogen, C₁-C₆-alkyl or C₁-C₆-alkylsulfonyl;
- R³ is halogen or C₁-C₆-alkylsulfonyl;
4. A synergistic herbicidal mixture as claimed in any of claims 1 to 3, comprising, as component A), a 3-heterocyclyl-substituted benzoyl derivative of the formula I, where
- 15 R² is a heterocyclic radical selected from the group: isoxazol-3-yl, isoxazol-5-yl and 4,5-dihydroisoxazol-3-yl, it being possible for the three radicals mentioned to be unsubstituted or mono- or polysubstituted by
- 20 halogen, C₁-C₄-alkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkyl, C₁-C₄-haloalkoxy or C₁-C₄-alkylthio.
5. A synergistic herbicidal mixture as claimed in any of claims 1 to 4, comprising, as component A), a 3-heterocyclyl-substituted benzoyl derivative of the formula I, where
- 25 R² is isoxazol-5-yl, 3-methyl-isoxazol-5-yl, 4,5-dihydroisoxazol-3-yl, 5-methyl-4,5-dihydroisoxazol-3-yl, 5-ethyl-4,5-dihydroisoxazol-3-yl or 4,5-dimethyl-4,5-dihydroisoxazol-3-yl.
- 30 6. A synergistic herbicidal mixture as claimed in any of claims 1 to 5, comprising, as component A), 4-[2-chloro-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole.
- 35 7. A synergistic herbicidal mixture as claimed in any of claims 1 to 5, comprising, as component A) 4-[2-methyl-3-(4,5-di-

hydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole.

- 5 8. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising, two active ingredients, a 3-heterocyclyl-substituted benzoyl derivative of the formula I (component A) as claimed in claims 1 to 7 and the compound of formula IIa (component B).
- 10 9. A synergistic herbicidal mixture as claimed in claim 8, comprising as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole and as component B) the compound of formula IIa.
- 15 10. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising, three active ingredients, a 3-heterocyclyl-substituted benzoyl derivative of the formula I (component A) as claimed in claims 1 to 7 and as component B the compound of formula IIa and the compound of formula IIb.
- 20 11. A synergistic herbicidal mixture as claimed in claim 10, comprising as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole and as component B) the compound of formula IIa and
- 25 the compound of formula IIb.
12. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising, two active ingredients, a 3-heterocyclyl-substituted benzoyl derivative of the formula I (component A) as claimed in claims 1 to 7 and as component B the compound of formula IIb.
- 30 13. A synergistic herbicidal mixture as claimed in claim 12, comprising as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole and as component B) the compound of formula IIb.
- 35 14. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising, at least,

- as component A) a 3-hetero-cyclyl-substituted benzoyl derivative of the formula I as claimed in claims 1 to 7;
as component B) at least the compound of formula IIa or the compound of formula IIb; and
5 as component C) at least one herbicidal compound from the group of the acetyl-CoA carboxylase inhibitors (ACC), acetolactate synthase inhibitors (ALS), amides, auxin herbicides, auxin transport inhibitors, carotenoid biosynthesis inhibitors, enolpyruvylshikimate 3-phosphate synthase inhibitors
10 (EPSPS), glutamine synthetase inhibitors, lipid biosynthesis inhibitors, mitosis inhibitors, protoporphyrinogen IX oxidase inhibitors, photosynthesis inhibitors, synergists, growth substances, cell wall biosynthesis inhibitors and a variety of other herbicides.
- 15 15. A synergistic herbicidal mixture as claimed in claim 1 or 14 comprising, as component C), at least one herbicidal compound from the groups C1 to C16:
- 20 C1 acetyl-CoA carboxylase inhibitors (ACC):
cyclohexenone oxime ethers, phenoxyphenoxypropionic esters or arylaminopropionic acids;
- 25 C2 acetolactate synthase inhibitors (ALS):
imidazolinones, pyrimidyl ethers, sulfonamides or sulfonylureas;
- C3 amides;
- 30 C4 auxin herbicides:
pyridinecarboxylic acids, 2,4-D or benazolin;
- C5 auxin transport inhibitors;
- 35 C6 carotenoid biosynthesis inhibitors;
- C7 enolpyruvylshikimate 3-phosphate synthase inhibitors (EPSPS);

- C8 glutamine synthetase inhibitors;
- C9 lipid biosynthesis inhibitors:
anilides, chloroacetanilides, thioureas, benfuresate or
perfluidone;
- C10 mitosis inhibitors:
carbamates, dinitroanilines, pyridines, butamifos,
chlorthal-dimethyl (DCPA) or maleic hydrazide;
- C11 protoporphyrinogen IX oxidase inhibitors:
diphenyl ethers, oxadiazoles, cyclic imides or pyra-
zoles;
- C12 photosynthesis inhibitors:
propanil, pyridate, pyridafol, benzothiadiazinones, di-
nitrophenols, dipyridylenes, ureas, phenols, chlorida-
zon, triazines, triazinones, uracils or biscarbamates;
- C13 synergists:
oxiranes;
- C14 growth substances:
aryloxyalkanoic acids, benzoic acids or quinolinecar-
boxylic acids;
- C15 cell wall synthesis inhibitors;
- C16 various other herbicides:
dichloropropionic acids, dihydrobenzofurans, phenylace-
tic acids or aziprotryn, barban, bensulide, benzthia-
zuron, benzofluor, buminafos, buthidazole, buturon,
cafenstrole, chlorbufam, chlorofenprop-methyl, chlo-
roxuron, cinmethylin, cumyluron, cycluron, cyprazine,
cyprazole, dibenzyluron, dipropetryn, dymron, eglina-
zin-ethyl, endothall, ethiozin, flucabazone, fluorben-
tranil, flupoxam, isocarbamid, isopropalin, karbuti-
late, mefluidide, monuron, napropamide, napropanilide,
nitralin, oxaciclomefone, phenisopham, piperophos, pro-

cyazine, profluralin, pyributicarb, sebumeton, sulfalate (CDEC), terbucarb, triazofenamide, triaziflam or trimeturon;

5 or their environmentally compatible salts.

16. A synergistic herbicidal mixture as claimed in claims 1 or 14, comprising, as component C), at least one herbicidal compound from the groups C1 to C16:

10

C1 acetyl-CoA carboxylase inhibitors (ACC):

- cyclohexenone oxime ethers:

alloydim, clethodim, cloproxydim, cycloxydim, sethoxydim, tralkoxydim, butroxydim, clefoxydim or tepraloxym;

15

- phenoxyphenoxypropionic esters:

clodinafop-propargyl (and, if appropriate, cloquintocet), cyhalofop-butyl, diclofop-methyl, fenoxaprop-ethyl, fenoxaprop-P-ethyl, fen-thiapropehtyl, fluazifop-butyl, fluazifop-P-butyl, haloxyfop-ethoxyethyl, haloxyfop-methyl, haloxyfop-P-methyl, isoxapyrifop, propaquizafop, quizalofop-ethyl, quizalofop-P-ethyl or quizalofop-tefuryl; or

20

- arylaminopropionic acids:

flamprop-methyl or flamprop-isopropyl;

25

C2 acetolactate synthase inhibitors (ALS):

- imidazolinones:

imazapyr, imazaquin, imazamethabenz-methyl (imazame), imazamox, imazapic, imazethapyr or imazamethapyr;

30

- pyrimidyl ethers:

pyrithiobac-acid, pyrithiobac-sodium, bispyribac-sodium, KIH-6127 or pyribenzoxym;

35

- sulfonamides:

florasulam, flumetsulam or metosulam; or

- sulfonylureas:

- 5 amidosulfuron, azimsulfuron, bensulfuron-methyl,
chlorimuron-ethyl, chlorsulfuron, cinosulfuron,
cyclosulfamuron, ethametsulfuron-methyl, ethoxy-
sulfuron, flazasulfuron, halosulfuron-methyl, ima-
10 zosulfuron, metsulfuron-methyl, nicosulfuron,
primisulfuron-methyl, prosulfuron, pyrazosulfuron-
ethyl, rimsulfuron, sulfometuron-methyl, thifen-
sulfuron-methyl, triasulfuron, tribenuron-methyl,
triflusulfuron-methyl, N-[[[4-methoxy-6-(tri-
10 fluoromethyl)-1,3,5-triazin-2-yl]amino]-carbonyl]-
2-(trifluoromethyl)-benzenesulfonamide, sulfosul-
furon or iodosulfuron;
- C3 amides:
15 - allidochlor (CDAA), benzoylprop-ethyl, bromobu-
tide, chlorthiamid, diphenamid, etobenzanid
(benzchlomet), fluthiamide, fosamin or monalide;
- C4 auxin herbicides:
20 - pyridine carboxylic acids:
clopyralid or picloram; or
- 2,4-D or benazolin;
- C5 auxin transport inhibitors:
25 - naptalame or diflufenzopyr;
- C6 carotenoid biosynthesis inhibitors:
- benzofenap, clomazone (dimethazone), diflufenican,
30 fluorochloridone, fluridone, pyrazolynate, pyra-
zoxifen, isoxaflutole, isoxachlortole, mesotrione,
sulcotrione (chlormesulone), ketospiradox, flurta-
mone, norflurazon or amitrol;
- C7 enolpyruvylshikimate-3-phosphate synthase inhibitors
35 (EPSPS):
- glyphosate or sulfosate;
- C8 glutamine synthetase inhibitors:
- bilanafos (bialaphos) or glufosinate-ammonium;

- C9 lipid biosynthesis inhibitors:
- anilides:
anilofos or mefenacet;
 - 5 - chloroacetanilides:
dimethenamid, S-dimethenamid, acetochlor, ala-
chlor, butachlor, butenachlor, diethatyl-ethyl,
dimethachlor, metazachlor, metolachlor, S-
10 metolachlor, pretilachlor, propachlor, prynachlor,
terbuchlor, thenylchlor or xylachlor;
 - thioureas:
butylate, cycloate, di-allate, dimepiperate, EPTC,
esprocarb, molinate, pebulate, prosulfocarb,
15 thiobencarb (benthiocarb), tri-allate or ver-
nolate; or
 - benfuresate or perfluidone;
- C10 mitosis inhibitors:
- carbamates:
20 asulam, carbetamid, chlorpropham, orbencarb,
pronamid (propyzamid), propham or tiocarbazil;
 - dinitroanilines:
benefin, butralin, dinitramin, ethalfluralin, flu-
chloralin, oryzalin, pendimethalin, prodiamine or
25 trifluralin;
 - pyridines:
dithiopyr or thiazopyr; or
 - butamifos, chlorthal-dimethyl (DCPA) or maleic hy-
30 drazide;
- C11 protoporphyrinogen IX oxidase inhibitors:
- diphenyl ethers:
acifluorfen, acifluorfen-sodium, aclonifen,
35 bifenox, chlornitrofen (CNP), ethoxyfen, fluoro-
difen, fluoroglycofen-ethyl, fomesafen, furyloxy-
fen, lactofen, nitrofen, nitrofluorfen or oxy-
fluorfen;
 - oxadiazoles:
oxadiargyl or oxadiazon;

- cyclic imides:
azafenidin, butafenacil, carfentrazone-ethyl,
cinidon-ethyl, flumiclorac-pentyl, flumioxazin,
flumipropyn, flupropacil, fluthiacet-methyl,
5 sulfentrazone or thidiazimin; or
- pyrazoles:
ET-751, JV 485 or nipyraclufen;

C12 photosynthesis inhibitors:

- 10 - propanil, pyridate or pyridafol;
- benzothiadiazinones:
bentazone;
- dinitrophenols:
15 bromofenoxim, dinoseb, dinoseb-acetate, dinoterb
or DNOC;
- dipyridylenes:
cyperquat-chloride, difenzoquat-methylsulfate,
diquat or paraquat-dichloride;
- ureas:
20 chlorbromuron, chlorotoluron, difenoxuron, dimefu-
ron, diuron, ethidimuron, fenuron, fluometuron,
isoproturon, isouron, linuron, methabenzthiazuron,
methazole, metobenzuron, metoxuron, monolinuron,
neburon, siduron or tebuthiuron;
- 25 - phenols:
bromoxynil or ioxynil;
- chloridazon;
- triazines:
30 ametryn, atrazine, cyanazine, desmetryn, di-
methamethryn, hexazinone, prometon, prometryn,
propazine, simazine, simetryn, terbumeton, ter-
butryn, terbutylazine or trietazine;
- triazinones:
metamitron or metribuzine;
- 35 - uracils:
bromacil, lenacil or terbacil; or
- biscarbamates:
desmedipham or phenmedipham;

C13 synergists:

- oxiranes:
tridiphane;

5 C14 growth substances:

- aryloxyalkanoic acids:
2,4-DB, clomeprop, dichlorprop, dichlorprop-P
(2,4-DP-P), fluoroxypyr, MCPA, MCPB, mecoprop, me-
coprop-P, or triclopyr;

10 - benzoic acids:

chloramben or dicamba; or

- quinolinecarboxylic acids:
quinclorac or quinmerac;

15 C15 cell wall synthesis inhibitors:

- isoxaben or dichlobenil;

C16 various other herbicides:

- dichloropropionic acids:
dalapon;

20 dihydrobenzofurans:
ethofumesate;

- phenylacetic acids:
chlorfenac (fenac); or

- 25 - aziprotryn, barban, bensulide, benzthiazuron, ben-
zofluor, buminafos, buthidazole, buturon, cafen-
strole, chlorbufam, chlorfenprop-methyl, chlo-
roxuron, cinmethylin, cumyluron, cycluron,
30 cyprazine, cyprazole, dibenzyluron, dipropetryn,
dymron, eglinazin-ethyl, endothall, ethiozin, flu-
cabazone, fluorbentranyl, flupoxam, isocarbamid,
isopropalin, karbutilate, mefluidide, monuron,
napropamide, napropanilide, nitralin, oxaciclome-
fone, phenisopham, piperophos, procyazine, proflu-
ralin, pyributicarb, secbumeton, sulfallate
35 (CDEC), terbucarb, triazofenamid, triaziflan or
trimeturon;

or their environmentally compatible salts.

17. A synergistic herbicidal mixture as claimed in 15, comprising, as component C), at least one herbicidal compound from the groups C5, C9 or C 12.
- 5 18. A synergistic herbicidal mixture as claimed in 17, comprising, as component C), at least one herbicidal compound from the groups C9 or C 12.
- 10 19. A synergistic herbicidal mixture as claimed in claim 15 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) at least the compound of formula IIa or the compound of formula IIb, and as component C) a herbicidal compound from the group C5.
- 15 20. A synergistic herbicidal mixture as claimed in claim 15 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) at least the compound of formula IIa or the compound of formula IIb, and as component C) diflufenzopyr.
- 20 21. A synergistic herbicidal mixture as claimed in claim 15 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) at least the compound of formula IIa or the compound of formula IIb, and as component C) a herbicidal compound from the group C9.
- 25 22. A synergistic herbicidal mixture as claimed in claim 15 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) at least the compound of formula IIa or the compound of formula IIb, and as component C) an a chloroacetanilide.
- 30 23. A synergistic herbicidal mixture as claimed in claim 15 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-
- 35

zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) at least the compound of formula IIa or the compound of formula IIb, and as component C) acetochlor.

5

24. A synergistic herbicidal mixture as claimed in claim 15 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) at least the compound of formula IIa or the compound of formula IIb, and as component C) a herbicidal compound from the group C12.

10

25. A synergistic herbicidal mixture as claimed in claim 15 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) at least the compound of formula IIa or the compound of formula IIb, and as component C) a triazine from group C12.

15

26. A synergistic herbicidal mixture as claimed in claim 15, comprising as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) at least the compound of formula IIa or the compound of formula IIb, and as component C) atrazine.

25

27. A synergistic herbicidal mixture as claimed in claim 15 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) at least the compound of formula IIa or the compound of formula IIb, and as component C) a herbicidal compound from the group C5 and a herbicidal compound from the group C12.

30

28. A synergistic herbicidal mixture as claimed in claim 15 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) at least the compound of formula

35

IIa or the compound of formula IIb, and as component C) an auxin transport inhibitor and a triazine.

29. A synergistic herbicidal mixture as claimed in claim 15
5 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) at least the compound of formula IIa or the compound of formula IIb, and as component C) an-
diflufenzopyr and atrazine.
- 10 30. Synergistic herbicidal mixture as claimed in any of claims 1 to 29, wherein component A) and B) are present in a weight ratio of 1:0.001 to 1:500.
- 15 31. Synergistic herbicidal mixture as claimed in any of claims 14 to 30, wherein component A) and component C) are present in a weight ratio of 1:0.002 to 1:800.
- 20 32. A herbicidal composition comprising a herbicidally active amount of a synergistic herbicidal mixture as claimed in any of claims 1 to 31, at least one inert liquid and/or solid carrier and, if desired, at least one surfactant.
- 25 33. A process for the preparation of herbicidal compositions as claimed in claim 32, wherein component A), component B), if desired, component C), at least one inert liquid and/or solid carrier and, if appropriate, a surfactant are mixed.
- 30 34. A method of controlling undesired vegetation, which comprises applying a synergistic herbicidal mixture as claimed in any of claims 1 to 31 before, during and/or after the emergence of undesired plants, it being possible for the herbicidally active compounds of components A), B) and, if desired, C) to be applied simultaneously or in succession.
- 35 35. A method of controlling undesired vegetation as claimed in claim 34, wherein the leaves of the crop plants and of the undesired plants are treated.